

1 **WHAT IS CLAIMED IS:**

1 1. A method of dynamic routing for efficiently
2 determining a message-transporting path between a sending host
3 and destination host on the Internet by finding a routing host
4 when the sending host cannot effectively connect to the
5 destination host, the method comprising the steps of:

6 a. directly transporting messages to the destination host
7 by the sending host, then ending the method if success, or
8 proceeding to step b;

9 b. finding a series of routers which can be effectively
10 connected to between the sending host and the destination host
11 and successively putting the Internet protocol (IP) addresses
12 of the series of routers into a list;

13 c. proceeding to step d if the list comprises at least
14 an IP address, otherwise proceeding to step i;

15 d. moving a pointer to point to the last IP address of
16 the list;

17 e. finding a domain of the IP address pointed by the pointer;

18 f. proceeding to step g if a message-routing-in-charge
19 host is found, otherwise proceeding to step h;

20 g. sending the messages to the message-routing-in-charge
21 host by the sending host, regarding the
22 message-routing-in-charge host as another sending host, then
23 proceeding to the step a;

24 h. proceeding to step i if the IP address pointed by the
25 pointer is the first IP address of the list, otherwise proceeding
26 step j;

27 i. keeping the messages in the sending host for a
28 predetermined time, then proceeding to the step a; and

29 j. moving the pointer to point to an IP address previous
30 to that presently pointed in the list and proceeding to the
31 step e.

1 2. The method according to claim 1, wherein the step
2 b uses a path-tracing program to find the series of routers
3 between the sending host and the destination host; the sending
4 host sends an IP datagram having a time-to-live (TTL) field
5 with a value of one to the destination host, and obtains an
6 IP address of the first router by receiving an Internet control
7 message protocol (ICMP) time-out message from the first router;
8 the sending host continuously sends an IP datagram having a
9 TTL field with a value repeatedly increased by one in order
10 to obtain the IP addresses of the series of routers which can
11 be effectively connected to until the sending host cannot

12 receive any ICMP time-out message.

1 3. The method according to claim 1, wherein the step
2 e uses the Domain Name Service (DNS) to find the domain of
3 the IP address pointed by the pointer.

1 4. The method according to claim 1, wherein the step
2 f uses an IP address of a message-routing host registered
3 beforehand in the Well Know Service (WKS) record of the DNS
4 as a way of querying the WKS record to find the IP address
5 of the message-routing-in-charge host.

1 5. The method according to claim 1, wherein the step
2 f uses the property that a name of message-sending service
3 can be regarded as an alias of the message-routing host to
4 find the IP address of the message-routing-in-charge host by
5 regarding the name of message-sending service as a querying
6 name.

1 6. A network communication system for efficiently
2 determining a message-transporting path between a sending host
3 and destination host on the Internet by finding a routing host
4 when the sending host cannot effectively connect to the
5 destination host, the system comprising:

6 a tracing means for finding a series of routers which
7 can be effectively connected to between the sending host and

8 destination host and successively putting the routers' IP
9 addresses into a list;

10 a memory means for storing the list;

11 a pointing means for pointing a pointer to an IP address
12 of the list;

13 a judging means for judging whether the list comprises
14 at least one IP address and judging whether the IP address
15 pointed by the pointer is the first IP address of the list;
16 and

17 a searching means for finding a domain of the IP address
18 pointed by the pointer and finding a message-routing-in-charge
19 host in the domain;

20 wherein at the beginning, when the judging means judges
21 that the list comprises at least one IP address, the pointing
22 means moves the pointer to point to the last IP address of
23 the list and when the searching means can not find the
24 message-routing-in-charge host in the domain of the IP address
25 pointed by the pointer, the pointing means moves the pointer
26 to point to an IP address previous to that presently pointed
27 in the list, wherein the pointing means continuously moves
28 the pointer to point to a previous IP address until the searching
29 means finds out the message-routing-in-charge host or the

30 judging means judges that the pointed IP address is the first
31 IP address of the list.

1 7. The system according to claim 6, wherein the tracing
2 means uses a path-tracing program to find the series of routers
3 between the sending host and the destination host; the sending
4 host sends an IP datagram having a time-to-live (TTL) field
5 with a value of one to the destination host, and obtains an
6 IP address of the first router by receiving an Internet control
7 message protocol (ICMP) time-out message from the first router;
8 the sending host continuously sends an IP datagram having a
9 TTL field with a value repeatedly increased by one in order
10 to obtain the IP address of the series of routers which can
11 be effectively connected until the sending host does not receive
12 any ICMP time-out message.

1 8. The system according to claim 6, wherein the
2 searching means uses the Domain Name Service (DNS) to find
3 the domain of the IP address pointed by the pointer and uses
4 an IP address of a message-routing host registered beforehand
5 in the Well Know Service (WKS) Record of the DNS as a way of
6 querying the WKS record to find the IP address of the
7 message-routing-in-charge host.

1 9. The system according to claim 6, wherein the
2 searching means uses the DNS to find the domain of the IP address
3 pointed by the pointer and uses the property of regarding a

- 4 name of message-sending service as an alias of the
- 5 message-routing host to find the IP address of the
- 6 message-routing-in-charge host by, using the name of the
- 7 message-sending service as a querying name.

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